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A Summary of Current Program 7/1/64
and Preliminary Report of Progress
for 7/1/63 to 6/30/64

U. S. DEPT. OF AGRICULTURE
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CLOTHING AND HOUSING
RESEARCH DIVISION
of the
AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE
and related work of the
STATE AGRICULTURAL EXPERIMENT STATIONS

This progress report is primarily a tool for use of scientists and administrators in program coordination, development and evaluation; and for use of advisory committees in program review and development of recommendations for future research programs.

The summaries of progress on USDA and cooperative research include some tentative results that have not been tested sufficiently to justify general release. Such findings, when adequately confirmed, will be released promptly through established channels. Because of this, the report is not intended for publication and should not be referred to in literature citations. Copies are distributed only to members of Department staff, advisory committee members, and others having a special interest in the development of public agricultural research programs.

This report also includes a list of publications reporting results of USDA and cooperative research issued between July 1, 1963, and June 30, 1964. Current agricultural research findings are also published in the monthly USDA publication, Agricultural Research. This progress report was compiled in the Clothing and Housing Research Division, Agricultural Research Service, U. S. Department of Agriculture, Beltsville, Maryland.

UNITED STATES DEPARTMENT OF AGRICULTURE
Washington, D. C.

July 1, 1964

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INTRODUCTION

Clothing and housing constitute the immediate protective environment in which people live and work, directly affect efficiency, comfort, and general well-being, and are of national concern. The demand for information about clothing and housing is being intensified by the increase in public and private programs to improve economic opportunities for disadvantaged segments of the population, such as the low-income and the elderly. Research-based guidance materials are needed to help consumers of different socioeconomic and cultural backgrounds, and living in different climatic areas, to make wise decisions regarding use of resources available to them.

The program of the Clothing and Housing Research Division is planned to provide basic information concerning functional needs for clothing and housing, and to determine the extent to which these needs can be more effectively met through improved use of the resources of individuals, families, and communities. Continually in focus is the Department's responsibility to provide research-based information of two types: 1) that needed for programs to improve the levels of living of rural people, and 2) that needed to improve consumer satisfaction in use of cotton, wool, leather, and other agricultural products.

Findings are reported not only in scientific articles and technical bulletins but also in semitechnical reports for use by leaders in education, industry, and government, and (in collaboration with information specialists) popular publications, exhibits, and other means of reaching the layman.

The Clothing and Housing Research Division has its headquarters at the Agricultural Research Center, Beltsville, Md. It is organized into two Laboratories: 1) Clothing and Textiles, and 2) Housing and Equipment. The Division's in-house effort amounts to 24.5 professional man-years. Approx-

mately 15 percent of the present effort is identified as basic research. The present report summarizes the current program of the Division and of the State Experiment Stations in the areas reported, and presents briefly the Division's progress toward the objectives of the Federal program during Fiscal Year 1964.

Two examples of recent accomplishments are given below:

Plans for Low-Cost Rental Housing Improved. Criteria for dimensions and arrangements of space within the home that were developed in previous research on farm housing were adapted to the special needs of the aging, using information obtained from elderly occupants of low-rental housing projects of the National Capital Housing Authority. The minimal housing requirements thus delineated by the CH staff were then used by NCHA to revise the preliminary architectural plans for three new low-cost housing projects now under construction in the Washington area. Many requests for information on findings of this study led to publication of a report which is being widely used by agencies concerned with housing for older people.

Instrument Developed for Measuring Elastic Recovery of Fabrics. Investigations now underway on the elastic recovery of cotton, wool, and WURLANized wool knit fabrics have resulted in the development by CH staff of a simple instrument for measuring this property. The new apparatus releases the Division's more expensive and versatile electronic equipment for other uses, yet gives comparable results. Because of its simplicity and successful performance, details concerning its construction and use are expected to be of interest not only to Department scientists studying performance of fabrics used in clothing and household textiles, but also to others whose work in research or in quality control involves measurement of elastic behavior.

AREA NO. 1: CLOTHING, HOUSEHOLD TEXTILES,
AND FABRICS FOR CONSUMER USE

Problem. As a result of the ever increasing variety of fibers, constructions and finishes used in household textiles and apparel, decision-making by consumers is becoming more and more difficult. The mandatory labeling of textile products as to fiber content only partially solves the problem. To obtain maximum benefit from such labeling, consumers need information on the properties imparted to textiles by different natural and manmade fibers, fiber blends, fabric constructions and finishes, and on the properties textiles need for satisfactory performance in specific uses. Consumers also need improved sizing systems for patterns and readymade clothing (including shoes) and designs for garment features that will contribute to the comfort, safety, and efficiency of the wearer.

USDA AND COOPERATIVE PROGRAMS

Investigations include studies of the relationship of in-use performance of fabrics of known fiber type, construction, and finish with laboratory determinations of such properties as elastic behavior and resistance to abrasion. Changes in appearance and other properties during use are followed both subjectively and objectively. Rapid and dependable methods for predicting performance in use are sought. Principles of construction for use in making, repairing, or altering clothing and household textiles are developed. Anthropometric data are obtained as a basis for the sizing of apparel. Clothing problems of both normal and handicapped individuals are identified through interviews and observations. Garment features are designed to solve these problems. Special attention is given to problems related to consumer use of clothing and household textiles made from cotton and wool.

The Federal scientific effort in this area, totaling 6.5 professional man-years, 1.8 of which is devoted to basic research, includes physicists, chemists, and specialists in textiles and clothing. Their headquarters is at Beltsville, Md.

PROGRAM OF STATE EXPERIMENT STATIONS

The States are engaged in both basic and applied research on textile fibers and properties and on the end-use performance of fabrics, clothing and household items. Over two-thirds of these projects contribute to the regional programs.

In the Southern region textile specialists are studying cotton fiber properties and have made tests to evaluate the effect of elongation on the lasting qualities of household textiles. Sheets were selected as the test items. Additional cotton fiber properties, such as length, strength, and fineness, will be studied. This is basic research of importance to both the consumer

interested in long-wearing household items and to the cotton producers who face the problem of marketing a fiber of known potential.

Researchers in the Western region are studying the effect of environmental conditions on cotton fabric. Atmospheric factors considered were air pollution, light, wind velocity, temperature, airborne dust, and moisture. The research is designed to yield insights regarding the degradation of cotton fabrics under use conditions and to explain the type of damage resulting from specific atmospheric exposures. As understanding develops, special fabric treatments to counteract effects can be considered.

In the North Central region research was recently completed on criteria for selection and use of girls' clothing. Winter skirts were used as test items. Basic work is being initiated dealing with fabric behavior under minimum stress conditions, such as pull, bending, and abrasion. Different fiber content, fabric geometry, and types of finishes will be studied. Broad principles are being sought which will apply, within reason, under changing market conditions.

Textile specialists and social scientists have joined forces in the Northeastern region to study the attributes of consumer satisfaction in relation to laboratory and other wear tests. This research is ongoing and again general principles useful to both the consumer and the manufacturer are sought.

Non-regional projects deal with the comfort of clothing of varying fiber content, with consumer questions relative to wool blankets and soft floor coverings, and with the relationship of price to quality characteristics of various items. More understanding of consumer behavior in relation to price and quality is sought to meet the needs of expanded consumer education programs.

The State program focuses on fiber and fabric properties as related to consumer wants and consumer problems. The total State research in this area involves approximately 15.3 professional man-years. Twenty-two States are contributing.

PROGRESS -- USDA AND COOPERATIVE PROGRAMS

A. Performance of Fabrics for Clothing and Household Textiles

Plain and double knit cotton fabrics suitable for outerwear were manufactured to specification from three sizes of yarn with varying numbers of courses per inch under contract with the Philadelphia School of Textiles and Science. Elongation and elastic recovery are being determined when the fabrics are new and after one and five launderings. (CH 1-30) Wool fabrics with varying numbers of courses per inch are being knit by the same contractor from yarns of three sizes, with and without a WURLAN finish applied by WURDD.

Determinations of elastic behavior and dimensional stability to laundering or drycleaning are to be made on these fabrics. (CH 1-31) The effects of staple length, mercerization, and blending with nylon on the end-use qualities of plain and rib knit cotton underwear fabrics were summarized in a report for publication. (CH 1-21, Disc.) Research on the causes and methods for preventing puckering of seams in "easy-care" cotton fabrics was discontinued, pending availability of personnel. (CH 1-23, Disc.)

B. Anthropometric Measurements Basic to the Sizing of Clothing

A search for information pertaining to the sizing of children's shoes was completed and an annotated bibliography on measurement of the human foot prepared. It was found that a comprehensive study of the dimensions and contours of the feet of American children is urgently needed as a basis for improved sizing systems for children's footwear. Preliminary plans for such a study were made at a conference in which representatives of the shoe and last industry and specialists in child development, anatomy, orthopedics, nutrition, physical anthropology, and clothing participated. (CH 1-25) Research to design instrumentation and develop procedures needed for the study was initiated through contract with the University of Rochester. (CH 1-34(C))

C. Functional Requirements for Clothing

Research to identify clothing problems common to many physically handicapped children, as a basis for developing garment features to eliminate or alleviate these problems, was resumed. (CH 1-24)

D. Information for Consumer Guidance

Development of procedures for estimating yardage, cutting, making, and hanging draw curtains was completed. A report developed primarily for use by extension workers and teachers is now being reviewed within the Division. (CH 1-26, Disc.) Manuscripts for two popular-type publications, one on clothing repair and the other on pattern alteration, are ready for review by the Information Division. (CH 1-28, Disc.)

PUBLICATIONS -- USDA AND COOPERATIVE PROGRAMS

Information for Consumer Guidance

Scott, Clarice L. 1963. Men's Suits--how to judge quality. Home and Garden Bul. No. 54, 31 pp. (Sl. Rev.).

AREA NO. 2: HOME CARE OF TEXTILES:
CHEMICAL AND MICROBIOLOGICAL PROBLEMS

Problem. The family's supply of clothing and household textile items represents not only a considerable initial investment but also requires a never-ending expenditure of time and money for keeping it in good condition. Reliable information about laundry aids, such as detergents, bleaches, and fluorescent brighteners for household use, is therefore in great demand. Requests are also being received for information on removal of pesticide residues from work clothes. To furnish guidance to consumers on selection and use of appropriate agents, information is needed on the nature of soils, stains, and contaminants, and their removal from cotton, wool, and other fabrics. Information is also needed on environmental and other factors that accelerate undesirable changes in appearance or other properties of textiles materials, and on means to prevent such changes. As textiles are potential disseminators of pathogenic and odor-producing microorganisms, investigations are needed on factors influencing their survival on fabrics, and on methods suitable for consumer use, for controlling such transmission.

USDA AND COOPERATIVE PROGRAMS

The Department has a continuing program to investigate 1) the nature of soil and its removal from fabrics, 2) the nature, causes, and prevention of undesirable changes in fabrics, and 3) the role of fabrics in the dissemination of microorganisms and means of control. Fabrics differing in construction, fiber content and finish are used in the work. Families and individuals cooperate in studies of natural soiling of clothing and household textiles, and of home-type laundering.

The research effort, totaling 5.5 professional man-years, one of which is devoted to basic research, includes chemists, microbiologists, and textile specialists. Their headquarters is at Beltsville, Md.

PROGRAM OF STATE EXPERIMENT STATIONS

The States have only a limited program in this area. Some research underway deals with the problems in maintenance of laminated textile products, including effect of heat, light, chemical solvents, and laundering. One basic project is concerned with the analysis of the residual soil remaining on fabrics after laundering and the means whereby soil remains attached to fabric. This aspect of the States' program totals 1.2 professional man-years with three States contributing.

PROGRESS -- USDA AND COOPERATIVE PROGRAMS

A. Removal of Soil and Prevention of Undesirable Changes in Textiles

Research is continuing on interactions between cotton fabrics and sodium hypochlorite bleach as a factor in the deterioration of cotton fabrics in home-type laundering. Studies on deterioration of the unsoiled fabrics are complete, and similar studies are in progress on fabric which has been soiled with oily compounds typical of those found in natural oily soil. (CH 1-29)

Other research indicates that reaction of low concentrations of oxides of nitrogen (such as may be found in gas dryers and as contaminants in the atmosphere) with nitrogenous oil contributes to the yellowing of cotton garments. A technical article based on the results of this research has been accepted for publication in the American Dyestuff Reporter. (CH 1-15, Disc.)

Studies are nearing completion of the whitening effects on fabrics of different fiber content of five chemically different types of fluorescent whitening agents under conditions simulating those used in home-type laundering. Six of the ten whiteners studied (all of which were described by the manufacturers as typical of those used in detergent formulations) were completely or almost completely ineffective when hypochlorite bleach was added to the whitener-containing wash water before introduction of fabric. These six whiteners were three stilbene and three coumarin compounds. One benzidine sulfone, one benzoxazole, and two benzimidazole whiteners retained their effectiveness. All ten whiteners retained their effectiveness in the presence of perborate bleach. All decreased in effectiveness when the fabrics were dried outdoors in sunlight. A paper based on this research was presented by invitation at the February 1964 meeting of the Washington Section of the American Association of Textile Chemists and Colorists. (CH 1-20)

B. Transmission of Microorganisms by Textiles and Its Prevention

Using Staphylococcus aureus as a test organism, the influence of fiber type, fabric construction, water temperature, and type of natural soil on re-deposition of bacteria on fabrics is being studied under controlled conditions which simulate home-type laundering. (CH 1-27)

Research was initiated to determine whether microorganisms of importance in household hygiene survive drycleaning and if so, whether they are transferred from one fabric to another during the cleaning process. Work to date has been directed chiefly toward the development of methods for recovery of microorganisms from solvents taken from drycleaning machines. A technique employing membrane (millipore) filters has been the most useful. (CH 1-32)

Studies with pine oil disinfectants in home-type laundering showed that when used in adequate amounts, products containing 80 percent pine oil were comparable in effectiveness to phenolic disinfectants. The findings were included in a paper on disinfectants for home laundering presented at the 1964 annual meeting of the American Society for Microbiology. (CH 1-19, Disc.)

Research was initiated under contract with the Southern Research Institute for quantitative studies of the survival and infectivity of viruses after inoculation of fabrics by contact, droplet nuclei (aerosols) and dust. (CH 1-33(C))

PUBLICATIONS -- USDA AND COOPERATIVE PROGRAMS

Removal of Soil and Undesirable Changes in Textiles

Furry, Margaret S. 1963. Detergents for Home Laundering. Home and Garden Bul. No. 49, 8 pp., illus. (Sl. Rev.)

McLendon, Verda I. 1964. Removing Stains from Fabrics: home methods. Home and Garden Bul. No. 62, 30 pp., illus. (Sl. Rev.)

Transmission of Microorganisms by Textiles and Its Prevention

Furry, Margaret S. 1964. How to Prevent and Remove Mildew: home methods. Home and Garden Bul. No. 68, 14 pp., illus. (Rev.)

McNeil, Ethel (Chairman), Blandford, Josephine M., Choper, Eva A., Graham, Robert T., Hoak, Franklin C., Oliva, Edward C., and Smith, Jack C. 1963. The Role of Bacteria in the Development of Perspiration Odor on Fabrics. Am. Dyestuff Reprtr. 52(25), pp. 87-90. (1963 Annual Inter-sectional Technical Paper Competition, AATCC.)

McNeil, Ethel. 1964. Dissemination of Microorganisms by Fabrics and Leather. Develop. in Indus. Microbiol., V. 5, pp. 30-35.

McNeil, Ethel. 1964. Sanitation in Home Laundering. Home and Garden Bul. No. 97, 8 pp., illus.

AREA NO. 3: RURAL FAMILY HOUSING

Problem. Much present-day farm housing is obsolete and in need of replacement or major repairs. Technological advances of many kinds are affecting the kind of work and leisure-time activities carried on in rural homes which consequently create changes in housing needs. Increases in population, both rural and urban, contribute to the demand for design criteria that take into account the living requirements of today's families. Special problems exist in relation to housing for low-income families and the elderly. Differences in cultural backgrounds and customs of disadvantaged families and in physical abilities of the elderly are known to exist and to affect housing requirements. Yet quantitative data essential for planning housing for these groups are virtually nonexistent.

USDA AND COOPERATIVE PROGRAMS

Field studies of housing requirements are conducted in rural areas differing in geographic or climatic conditions and among groups with widely differing cultural backgrounds and economic resources. Type and scope of household activities are investigated; patterns of use of water, electricity, and gas are studied; and the dimensions and arrangements of space needed for family living are determined. Efficient and energy-saving ways of performing household tasks, using housing facilities and mechanical equipment of different designs, are developed. Based on results of these investigations, criteria for efficient arrangements of kitchens and other areas of the house are established, and planning guides and house plans are developed to meet the needs of families and those who work with them. The special needs of the programs of the Farmers Home Administration, Federal Extension Service, Public Housing Administration, and of architects, designers, builders, and educators are considered.

Home economists and architects collaborate in the research which is conducted at headquarters in Beltsville, Md. The Division's scientific effort devoted to research in this area is approximately 8.0 professional man-years, of which 1.5 are basic in nature.

PROGRAM OF STATE EXPERIMENT STATIONS

The States' research program in the area of Rural Family Housing and Household Operations has focused strongly on environmental factors as they affect human comfort and space use in the home. About two-thirds of the program is regional, with the Southern and Western regions participating. The Department is cooperating with the Southern regional program.

In the West scientists have studied the brightness of natural light and the problems encountered in modifying the condition through both internal and external treatments. Experimentation with changes in texture, color, fabric,

and structural design have been evaluated for both visual and thermal comfort. Of special interest has been the study of methods of control for home openings that effects of sun and wind might be modified.

Fiscal 1963 represented the end of a 15-year housing research program in the Southern region. Studies have been directed toward space needs in the home and construction and materials problems. Fifty-three State and twelve Department publications, articles, and papers plus five unpublished theses have reported this long-term effort. New work in the Southern region will deal with environmental factors related to improved rural family housing.

Non-regional studies have included such items as heat loss through walls of homes experiencing wide variations in climatic conditions. An extensive study was made of housing needs of the aged, and physiological responses of women engaged in household tasks and working under varying household conditions. Also of interest has been work dealing with the organizational aspects of homemaking.

Total State program in fiscal 1963 amounted to 12.0 professional man-years. Fourteen States contributed.

PROGRESS -- USDA AND COOPERATIVE PROGRAMS

A. Family Requirements

Seasonal records of water consumption in Maryland farm households, obtained in cooperation with Agricultural Engineering Research Division, were completed on five farms. The average per-capita daily consumption was 55 gallons with a range between households of 32 to 102 gallons per person per day. There was an average day-to-day variation within the same household of 30 to 50 gallons per person. Water requirements for machine laundering were estimated for the 200 families interviewed in the 1962 field study. The per person requirement was 7⁴ gallons per week for families with automatic washers as contrasted with 26 gallons per week for families with nonautomatic washers. Family composition and size did not affect the per person water requirements for laundering with nonautomatic equipment but with automatic equipment, the per person requirement increased for all-adult families and decreased as family size increased. A report of the findings was presented at the annual meeting of the American Society of Agricultural Engineers in June 1964. Technical reports are in preparation. (CH 2-16, Disc.)

Laboratory work was initiated to determine the human energy costs of performing household tasks in different environmental temperatures and humidities. (CH 2-20) Statistical analysis of data from a study of energy expenditures for cleaning operations was completed and a technical report is in preparation. (CH 2-4, Disc.)

A bibliography was compiled and citations summarized on materials and methods for the care and protection of household metals. Work continued on a similar bibliography on floor, counter, and wall coverings. (CH 2-11)

B. Planning Guides and House Plans

Three House Planning Aids, on laundry, dining, and linen storage areas, were prepared and preparation of two others, on workrooms and bathrooms, is underway. Each leaflet translates into simple pictorial form the findings of regional research applicable to the design of houses for families with low and medium incomes. The leaflet series, directed particularly to the needs of clients of the FHA's home loan improvement program, was introduced in 1963 by five leaflets on kitchen planning, all of which went into the second printing in 1964. (CH 2-18)

In cooperation with AE and at the request of the Farmers Home Administration and the Southern Regional Plan Exchange Committee, emphasis was given to the development of plans for houses of 1000 to 1200 square-foot size. Three plans for three-bedroom houses, all under 1200 square feet, were completed, as were the plans for another three-bedroom but slightly larger house. Plans for four other houses, ranging in size from two to four bedrooms and including a tenant house, are in preparation. (CH 2-9)

A home economist with special training and experience in home lighting, on leave from Purdue University, joined the CH staff for two months to prepare source material for a new bulletin on home lighting. Representatives of Rural Electrification Administration, Agricultural Engineering, and ARS Information Division assisted in planning the format and content of the bulletin which will be directed to the home owner and homemaker. (CH 2-11)

PUBLICATIONS -- USDA AND COOPERATIVE PROGRAMS

Planning Guides and House Plans

Anonymous. 1963. 5-Bedroom Farmhouse with Basement. Cooperative Farm Buildings Plan Exchange Plan No. 7153. USDA Misc. Pub. No. 946, 2 pp., illus. (CH and AE cooperating)

Howard, Mildred S., Tayloe, Genevieve, and Parker, W. Russell. 1963. House Planning Aid: Corner Storage in Kitchens. Misc. Pub. No. 944, 4 pp., illus.

Howard, Mildred S. and Parker, W. Russell. 1963. Housing for the Elderly. ARS 63-1, 20 pp., illus.

AREA NO. 4: HOUSEHOLD EQUIPMENT

Problem. Household equipment holds a unique position among a family's possessions in that satisfactions gained from it are almost exclusively in relation to satisfactions with some other household possession or operation such as quality of foods baked, appearance of laundered garments, or cleanliness of carpets and floors. Because of this, homemakers need and are asking for information on selection, use, and care of household equipment. To obtain the information needed for such guidance, performance requirements and operating characteristics of different designs of equipment must be determined.

USDA AND COOPERATIVE PROGRAMS

The Department has a continuing program of applied research conducted by home economists and physicists on operating characteristics and performance requirements for household equipment, and methods of caring for equipment and nontextile furnishings. Test procedures for these determinations are developed as necessary. Technical data are made available for incorporation into Federal specifications. Investigators prepare unbiased guidance materials for consumers and serve the consumers' interest on committees of the American Standards Association responsible for developing trade standards for household equipment and utility systems for the home.

The research program is carried on at Beltsville, Md., and in Fiscal Year 1964 totaled 4.5 professional man-years. Manufacturers cooperate in this work by giving consultation in the selection of models to be used and in development of test procedures, and by consigning household equipment.

PROGRAM OF STATE EXPERIMENT STATIONS

The States' research on household equipment and nontextile furnishings is limited. One State has been concerned with the control of temperature and humidity effects of operation of household appliances, one with the efficiency of thermostatically controlled gas and electrical units, specifically in relation to type of cooking utensil used, and one with effect of dishwasher on space use under different kitchen arrangements and different work loads the kitchen serves.

The total State program in fiscal 1963 was 2.1 professional man-years.

PROGRESS -- USDA AND COOPERATIVE PROGRAMS

A. Functional Requirements and Specifications

Work previously completed on temperatures for hand ironing of present-day fabrics was supplemented by tests with six new fabrics--two cottons, two silks, and two wools of weights differing from those previously studied. Findings have been incorporated into the technical report which is being prepared for publication in the Home Economics Research Report series. (CH 2-15, Disc.)

American Standards Association committee work leading to development of specifications for household equipment continued through assignments of CH staff to Sectional Committees A-112, C70, C71, C72, Z21, and Z61. Appropriate action was taken on the following proposed American Standards: Hot Plates and Disc Stoves, Fan Forced and Radiant Electric Air Heaters, Waffle Bakers and Sandwich Grills, Automatic Electric Coffeemakers, Automatic Electric Toasters, Electric Bed Coverings, Household Electric Ranges, Standards for Safety of Home Laundry Equipment, Domestic Gas Ranges, Gas Fired Steam and Hot Water Boilers, Gas Furnaces, Unit Heaters, Duct Furnaces, Gas Heavy Duty Forced Air Heaters, Gas Infrared Radiant Heaters, Gas Clothes Dryers. (CH 2-6)

B. Operating Characteristics, Use, Maintenance, and Care of Equipment

For study of performance of mechanical home dishwashers, over 300 test loads of naturally and artificially soiled dishes were washed in 14 representative home dishwashers. An additional variable, water hardness (1-2 grains and 10-11 grains) was included when laboratory work indicated that hardness of water was related to the soil-removal ability of dishwashers. Evaluation of the test results to date indicate that both the artificial soil developed for the study and the method of using a panel of judges to inspect dishes for cleanliness were effective for differentiating the performance of the dishwashers in removing food residues. Technical articles describing the development of the experimental soil are in preparation. (CH 2-17)

Microbiological study of naturally soiled dishes washed in the mechanical washers has been completed and a report is in preparation.

PUBLICATIONS -- USDA AND COOPERATIVE PROGRAMS

Operating Characteristics, Use, Maintenance, and Care of Equipment

Choper, Eva A. and McNeil, Ethel. 1963. The Use of a Plastic Mold for the Enumeration of Bacteria on Cups. J. of Environ. Health 26(2): pp. 94-100, illus.

Line Project Check List -- Reporting Year July 1, 1963 to June 30, 1964

Work and Line Project Number	Work and Line Project Titles	Work Locations During Past Year	Line Project Incl. in Summary of	
			Progress (Yes-No)	Area and Subheading
CH 1	Fabric quality, construction, and care of clothing and household textile articles.			
CH 1-15	Yellowing of cotton fabrics.***	Beltsville, Md.	Yes	2-A
CH 1-19	Evaluation of antimicrobial agents for use in home laundering.***	Beltsville, Md.	Yes	2-B
CH 1-20	Improvement of fabric color with fluorescent whiteners.	Beltsville, Md.	Yes	2-A
CH 1-21	End-use qualities in knitted fabrics as affected by staple length, by mercerization, and by blending of medium staple cotton with nylon.**	Beltsville, Md. Spring City, Pa.	Yes	1-A
CH 1-23	Principles of clothing construction on modern cotton fabrics.**	Beltsville, Md.	Yes	1-A
CH 1-24	Clothing to meet the requirements of children.	Beltsville, Md.	Yes	1-C
CH 1-25	Bibliography of research pertaining to children's shoes.**	Beltsville, Md.	Yes	1-B
CH 1-26	Draw Curtains--Development of procedures for estimating yardage, cutting, making, and hanging.**	Beltsville, Md.	Yes	1-D
CH 1-27	Redeposition of bacteria on fabrics during laundering.	Beltsville, Md.	Yes	2-B
CH 1-28	Clothing Repair--A revision of Farmers' Bulletin 1925, "ABC's of Mending."***	Beltsville, Md.	Yes	1-D
CH 1-29	Use of hypochlorite bleach on soiled cotton fabrics as a factor in deterioration of cotton fabrics.	Beltsville, Md.	Yes	2-A
CH 1-30	Elastic recovery of cotton fabrics of plain and double knit constructions.	Beltsville, Md.	Yes	1-A
CH 1-31	Elastic recovery and dimensional stability of plain knit wool fabrics.*	Beltsville, Md.	Yes	1-A
CH 1-32	The microbiology of drycleaning.*	Beltsville, Md.	Yes	2-B
CH 1-33(C)	Quantitative studies on fabrics as disseminators of microorganisms.*	Beltsville, Md. Birmingham, Ala.	Yes	2-B
CH 1-34(C)	Development of instrumentation and procedures for anthropometric measurements essential for the improvement of sizing systems for children's footwear.	Beltsville, Md.	Yes	1-B
CH 2	Functional requirements, use and care of the house and its equipment.			
CH 2-4(R)	Human energy expenditures for household activities.**	Beltsville, Md.	Yes	3-A
CH 2-6(R)	Preparation of specifications for household equipment.	Beltsville, Md.	Yes	4-A
CH 2-9(R)	Participation in development of farmhouse plans for Regional Exchange Services.	Beltsville, Md.	Yes	3-B
CH 2-11(R)	House planning guides for rural homes.	Beltsville, Md.	Yes	3-A & B
CH 2-14	Planning guides for energy-saving kitchens and workrooms.	Beltsville, Md.	No	
CH 2-15	Hand-iron temperatures for present-day fabrics.**	Beltsville, Md.	Yes	4-A
CH 2-16	Farm household water use: A pilot study.**	Beltsville, Md.	Yes	3-A
CH 2-17	Performance of mechanical dishwashers for the home.	Beltsville, Md.	Yes	4-B
CH 2-18	Guides for planning activity and storage areas in housing for low- and medium-income families.	Beltsville, Md.	Yes	3-B
CH 2-20	Effect of ambient temperature and humidity on human energy costs of performing typical household activities.*	Beltsville, Md.	Yes	3-A

*Initiated, **discontinued during reporting year. ***Discontinued prior to reporting year.